



Pavement

JUNE 2022

Project Title:
Quieter Pavement Long-term
Monitoring

Task Number: 2710

Start Date: October 1, 2014

Completion Date: November 30,
2017

Task Manager:
Yue Wang
Transportation Engineer
yue.wang@dot.ca.gov

Quieter Pavement Monitoring

This research monitors the surface characteristics of specific concrete pavements and investigates the 2015 smoothness specification

WHAT WAS THE NEED?

Over the past few decades, awareness of the impacts of highway traffic noise has grown with increases in the number of vehicles and the populations either living close to highway corridors or conducting activities near them. In response, many departments of transportation have recognized the need to better understand the surface characteristics of pavements—not only because of the effect of pavement surface friction on safety and ride quality, but also because pavement surface characteristics contribute to noise generation through interaction with the vehicle's tires.

In the early 2000s, the California Department of Transportation (Caltrans) identified a need for research on the noise-related performance properties of pavement surface textures used on the state highway network. In 2006 and 2008, research projects were initiated to evaluate the tire/pavement noise characteristics of existing asphalt and the performance properties of concrete pavements. This task is a continuation of the noise performance monitoring for selected quieter pavement test sections including continuously reinforced concrete pavements (CRCP) and grind and groove (GnG) surfaced jointed plain concrete pavements (JPCP). Pilot projects were constructed to study the surface characteristics of the GnG surface, often in comparison to conventional diamond grinding (CDG). In addition, CRCPs are increasingly used in the state, and little data exists as to their performance in terms of tire-pavement noise.

WHAT WAS OUR GOAL?

The goal of this project was to continue to measure noise and smoothness on previous concrete pavement surfacing techniques and on the new GnG surface and CRCP.



DRISI provides solutions and
knowledge that improves
California's transportation system

WHAT DID WE DO?

Previous studies initiated the investigation into both the noise properties of GnG and CRCP. This project gathered data on the performance of these concrete pavements in terms of noise and smoothness. Measurements were taken on existing GnG pilot sections and adjacent diamond grind sections for comparison at seven locations in Sacramento, San Joaquin, Yolo, and San Diego Counties. Measurements were taken on five continuously reinforced concrete pavement pilot sections in Imperial, Siskiyou, Kern, and Placer Counties.

Smoothness measurements were taken on twenty-six new concrete surfaces, consisting of diamond grind, continuously reinforced concrete pavement, and jointed plain concrete pavement projects, constructed in 2014 and 2015, from seventeen counties representing all the districts except Districts 1 and 9.

WHAT WAS THE OUTCOME?

The GnG technology on test sections in Caltrans pilot projects was evaluated in terms of measured tire/pavement noise, smoothness, friction, and surface drainability. The research report presents the results of testing completed in 2016 and 2017 on sections first tested in 2012 and 2013. Recommendations include continued use of GnG and monitoring the long term performance of GnG, considering use of the GnG surface texture on CRCP pavement sections, and continued use of diamond grinding.

WHAT IS THE BENEFIT?

These data collected in this research add to the noise database to further the development of specifications, guidelines, and standardized field test methods toward quieter pavements. The research closes the gap in information regarding two pavement types not covered in previous noise studies, and of significant interest to pavement maintenance engineers.

Understanding the smoothness characteristics of the different concrete pavement types provides engineers information that directly relates to the road user experience. The results of this study are to further incorporate quieter pavement research into standard Caltrans practice and understand how it may serve as a basis for changes in quieter pavement policy and specifications.

LEARN MORE

When the reports are published, they can be found at the following link.

<https://escholarship.org/uc/item/7j88s7mt>

IMAGES

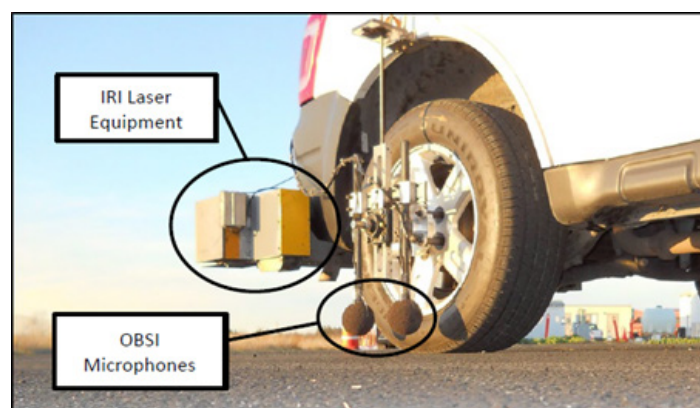


Image 1: The UCPRC OBSI and IRI test vehicle with mounted microphones and laser equipment